

FHWA

Hot Mix Asphalt Pavement Guidelines

Project Information:

Project Description:			Contract No:
Series (50, 60, 70, 80):	Nominal Layer Thickness (mm):	Item Number:	PIN:
In company with:			
Date of Inspection:	Inspection Made By:		Time of Day:
Contractor:	Contract Amount:	Time Elapsed (%):	Work completed (%):

This guideline was prepared utilizing the below references. The checks included in the guidelines are considered to be the major items and can be supplemented as deemed necessary by the inspecting party. The Area Engineer is provided the flexibility of using the guideline in its entirety or portions depending on the job conditions and/or time limitations.

NOTE: The vast majority of paving done on __DOT projects today utilize performance related specifications. Under performance related specifications, the contractor is responsible for compacting the pavement within a specified density range (Series 50, 60, and 70). Because the contractor is responsible for compacting the pavement, then the contractor should have the authority to dictate factors such as mix temperature (165 °C is the maximum), rolling trains, patterns, or passes.

References:

1. Standard Construction Specifications
2. Current Quality Assurance Program for Hot Mix Asphalt and Concrete Pavements
3. Applicable Special Provisions
4. Hot-Mix Bituminous Paving Manual, Federal Highway Administration
5. Hot-Mix Asphalt Paving Handbook, US Army Corps of Engineers
6. Hot Mix Asphalt Construction, Participant Manual for NHI Course 13132

HMA Materials

Materials mixed at any HMA plant must have prior State approval. Course and fine aggregate sources must be approved by the Regional Materials Engineer. The Superpave Mix Design must satisfy the requirements of Section XXX and the mixture design procedure as written in Materials Method X.X and be submitted to the Regional Materials Engineer. The State DOT website has a list of all approved material sources/suppliers.

- a. Has the Superpave Mix Design/Job Mix Formula (JMF) been submitted and approved by the Regional Materials Engineer? Ask for a copy.

YES NO

Part I : Paving Operation - Field Portion

Pre-paving Meeting- Prior to the start of the paving operation, a pre-paving meeting should be held approximately one week before paving operations commence and key personnel (placement, inspection and supply). The contractor should present the paving 'plan' discussing surface preparation, paving and compaction widths/sequences, temperatures, compaction, equipment pre-check arrangements, etc. Such meetings shall be

documented in the Engineer's Diary. Was a pre-paving meeting held? YES NO

I. Weather and Seasonal Limitations (specification reference)

Do not place HMA plant mix on any wet surface or when the surface temperature is less than specified in Table XXX, Temperature and Seasonal Requirements, or when weather conditions will prevent proper handling or finishing of the HMA mixtures.

- a. Is the minimum surface temperature being observed based on the course thickness in Table XXX (applies to all surface course paving whether it is on the mainline or shoulders)?

YES NO

TABLE 402-2 TEMPERATURE AND SEASONAL REQUIREMENTS		
Nominal Compacted Lift Thickness	Surface Temperature Minimum (Note 1)	Seasonal Limits
>=100 mm	5 °C (40 °F)	None
>= 50 mm but < 100 mm	8 °C (47 °F)	Notes 2 & 3)
< 50 mm	10 °C (50 °F)	(Notes 2 & 3)

1. Measure all temperatures on the surface where the mixture is to be placed and the controlling temperature will be the average three temperature readings taken at locations ±8 meters apart.
2. Place Top Course only during the period of April 1st up to and including the third Saturday of November in the counties of ...
3. Place Top Course only during the period of May 1st up to and including the third Saturday of October in all counties except as noted in Note 2

(Above table provides lift thickness and applicable temperature criteria)

An approved warranty is the only mechanism, which allows the contractor to place **top course** HMA outside the weather, seasonal and temperature requirements of the specifications.

II. Construction Equipment

HMA Pavers (Spec reference)

HMA Paver Manufacturer: Model Number:

- a. Is the HMA Paver self-powered? YES NO
- b. Is it capable of lane width placement? YES NO
- c. Is the screed heated at the beginning of the paving operation or after periods of extended shutdown to avoid sticking? YES NO
- d. Is the automatic transverse slope control approved? YES NO
- e. Is the automatic longitudinal grade screed control approved? YES NO
- f. From what references do the controls operate (fixed or moving)? Controls must be approved by the EIC.
_____ FIXED (taut reference line at or near pavement centerline or edge supported at approx. 8m intervals)
_____ MOVING (floating beam, ski, or other suitable type at least 9m in length)
- g. Are auger and tunnel extensions mounted on the paver when the screed is extended more than 0.3 m

for fixed paving widths wider than 3.6m? YES NO NA

- h. If the paving width is greater than 5.2 m, are the references on both sides of the pavement?
YES NO NA
- i. Was the paver examined and approved? Items to be examined include the screed (for warping), vibrators, heaters, grade control mechanism, etc. YES NO

Hauling Equipment (Section 402-3.03)

- a. Is the truck bed clean and free of foreign debris (dirt, gravel, etc.)? YES NO
- b. Is the HMA covered with waterproof cover during transportation? YES NO
- c. When hauling beds are lubricated, are approved release agents being used? YES NO

Release Agent: _____

Rollers (Spec reference)

Roller:	Type:	Manufacturer:	Model #:
1 - Breakdown			
2 - Intermediate			
3 - Finish			

Are the rollers examined and approved? YES NO

A. Vibratory Roller

- a. Is the vibratory roller model on the State's current Approved List for Hot Mix Asphalt Vibratory Compaction Equipment? YES NO NA
- b. Vibratory Rollers shall met the following requirements when not on the 'approved list':

Nominal Amplitude	1.25 mm maximum
Vibration Frequency	1500 vpm minimum
Drum Width (dual vibrating drums)	1.3 m minimum
(single vibrating drum)	2.1 m minimum

Does the vibratory roller meet these requirements? YES NO NA

- c. All vibratory rollers shall be equipped with a speedometer that accurately indicates roller speed in either 1km/hr or 15 m/min increments (maximum). Does the roller have an acceptable speedometer? YES NO NA
- d. Does the vibratory roller have a Materials Bureau approved speed control device, which prevents speed in excess of 4 km/hr or 67 m/min when the roller is in vibratory mode?
YES NO NA

B. Static Steel-Wheel Roller

The static steel-wheel roller shall be self-propelled and be either:

- a. 9 to 11 metric ton tandem three axle type
- b. 7 to 9 metric ton tandem two axle type

Check the rating plate on equipment or equipment 'specification sheet' provided by contractor. Does the roller meet these requirements? YES NO

C. Pneumatic Rubber-Tire Roller

Pneumatic rubber-tire rollers shall be self-propelled and consist of two axles on which multiple pneumatic-tired wheels are mounted in such a manner that the rear wheels shall not follow in the tracks of the forward wheels and would be spaced to give essentially uniform coverage on each pass. An approved release agent shall be applied to the tire to prevent picking of material. Pneumatic rollers shall meet the following requirements unless otherwise approved:

Maximum Wheel Load	2,600 kg
Tire Compression on Pavement	550 ±35 kPa
Maximum Axle Load	10,160 kg

Does the pneumatic roller meet these requirements? YES NO NA

III. Conditioning of Existing Surface (Spec reference)

- a. Is the condition of the subgrade, base, or bituminous surface satisfactory for HMA placement? (ex. clean, dry, etc.) YES NO
- b. Is the tack or prime coat specified (Spec reference)? YES NO
- c. The tack coat shall be uniformly applied to a prepared clean surface of all contact surfaces including all pavement layers, pavement edges, curbing, gutters, manholes and other structures. The tack coat shall not be applied to wet pavement surfaces or when the surface temperature is below the temperature requirements in Table XXX. The application rate shall be approved by the Engineer and be between 0.14 to 0.32 L/m².

What is the tack coat application rate? _____

Does the tack coat application meet the above requirements? YES NO

- d. Does the tack coat precede the asphalt paving such that the tack is not damaged? YES NO
- e. Are the depressions and wheel path ruts filled prior to the paving of the truing and leveling course?
YES NO

IV. Spreading and Finishing (Spec reference)

- a. Paving over a tack coat should not commence until the emulsion has broken (goes from brown to black) or is tacky when touched. Was this requirement met before paving commenced? YES NO
- b. Does the delivery tickets contain the correct information: the contract number, item number, job mix formula, tonnage, date, and time? YES NO
- c. When placed, what is the temperature of the mix? _____
The temperature should be within 10 °C of the temperature specified by the contractor.
- d. Is the truck delivery of the plant material frequent enough to prevent idling of the pavement operation resulting in rollers standing on a fresh mat? YES NO
- e. When trucks are dumping into the hopper, are wheels in contact with rollers? YES NO
Is any excess bumping observed? YES NO
- f. Is the paver running at a constant speed to match the delivery of asphalt? YES NO

If not, the paver should stop and start smoothly and quickly.

- g. Is a constant head of material kept in front of the screed and in the hopper? YES NO
Is any excess material dropped in front of the paver? YES NO
- h. Is the paver equipped with automatic grade/slope controls? YES NO
Normally automatic controls are required unless existing grades at roadway intersections or a drainage structure must be met or if paving shoulders, temporary detours, behind curbs, or in other areas where its use is impractical as determined by the Engineer.
- i. Are the following being checked and at what frequency?
- depth checks observed frequency _____ YES NO
 - mat temperature observed frequency _____ YES NO
 - cross slope observed frequency _____ YES NO
- j. Is the loose mat checked, any irregularities adjusted, and all unsatisfactory material removed and replaced prior to the beginning of rolling? YES NO

V. Compaction (Spec reference)

- a. Is the proper compaction method associated to specific items being placed being utilized**?
YES NO
- ____ 50 Series (A) - Performance based target density (PBDT), requires daily coring
____ 60 Series (B) - PBDT - specifies core samples and nuclear density gauge
____ 70 Series (C) - PBDT - nuclear gauge with initial calibration, low volume jobs
____ 80 Series (D) - Method specified dependent on pavemen course (ranges are 4-6 passes vibratory and 2-4 passes static)

**Refer to Section XXX for detailed requirements and options for each compaction method.

- b. Is there a specified rolling pattern for this job? YES NO
- If yes, what is it and is it being implemented on site? YES NO
- c. Initially roll all courses with the roller traveling parallel to the centerline of the pavement beginning at each edge and working towards the center. Is this method being followed? YES NO
- d. Are the banked curves rolled starting at the low side edge and working toward the super-elevated edge? YES NO NA
- e. Are the rollers moving at a constant, slow speed with the drive wheels nearest the paver? YES NO
- f. Are the roller wheels being kept moist (use of fuel oil is prohibited)? YES NO
- g. If the roller displaces any material, is the material replaced and grade restored to original grade?
YES NO NA
- h. There shall be no visible defects, such as shallow ruts, ridges, roller marks, cracking, tearing, segregation, or any other irregularities in the pavement when the rolling operation is complete. Are there any visible defects? YES NO

If yes, what are they? _____

VI. Joints (Spec reference)

- a. The pavement of successful courses will be such that all joints are offset no more than 150mm from

the joint of the lower pavement course, unless approved by the Engineer. Is this requirement met?
YES NO NA

- b. Is the transverse joint compacted in static mode with the roller parallel to the joint and perpendicular to traffic? YES NO NA
- c. On the top course, is the longitudinal joint on the lane line? YES NO NA
- d. An exposed joint in excess of 30 meters must be a tapered edge joint. If left overnight, warning signs must be placed at a maximum spacing of 300 meters to alert drivers.

VII. Surface Tolerance (Spec reference)

- a. Construct the pavement surface to a 6mm tolerance. Has the State determined a need to check the surface tolerance utilizing a 5 meter straight edge or string line placed parallel to the centerline of the pavement and with a 3 meter straight edge or string line placed transversely to the centerline of the pavement on any portion of the pavement? YES NO
- b. Are any irregularities exceeding the 6mm tolerance limits corrected? YES NO

VIII. Thickness Tolerance (Spec reference)

A depth tolerance not to exceed 6mm from the nominal thickness required (per plan) for the course specified under one pay item will not be acceptable where the required nominal thickness is 100 mm or less. A tolerance not to exceed 13 mm from the nominal thickness required for the course or courses specified under one pay item will be acceptable where the required nominal thickness is over 100 mm. The total thickness of all HMA mixture courses will not vary from the total nominal thickness indicated on the plans by more than 6 mm where the total nominal thickness is 100 mm or less; or by more than 13mm where the total nominal thickness is over 100mm but not more than 200 mm; and by not more than 16 mm where the total nominal thickness is more than 200 mm. When the HMA mixture is placed on newly constructed subbase material, an additional tolerance of plus 6 mm will be allowed both in the nominal thickness of the course placed directly on the subbase and the total pavement thickness.

- a. Are depth checks being taken? YES NO

Nominal Thickness (per plan): _____

Depth Check Readings: (after compaction) _____

IX. Pavement Density Samples (Spec reference) & Compaction Testing (Spec reference)

Test Section

The contractor will pave a test section for Series 50, 60, and 70 paving.

What is the date and location of placement of the test section associated with the paving operation?

Date: _____ Location: _____

- a. What were the results?
- b. What was the loose-lift and after compaction layer thickness?

Loose-Lift Thickness _____ After Compaction Thickness _____

- c. Was the test section the same depth, at least 50 m long and used the same equipment as the paving operation? YES NO
- d. How was the pavement density determined?

_____ Coring _____ Nuclear Gauge

- e. If the nuclear gauge is used, was the density measured after each roller pass? YES NO

Core Testing

- a. Is coring required for this lift? (see proposal) YES NO
- b. Has the project staff randomly defined four 150 mm diameter Coring locations per lot? YES NO
- c. Have these locations been withheld until the compaction operation is complete? YES NO
- d. How did the project staff determine the random locations?
_____ Material Bureau computer program "Random"
_____ Random # table from XX(spec reference)
- e. Have the cores been wrapped in a red security seal immediately after drilling in the presence of a state inspector? Has form BXXX been completed, put into a waterproof envelope and placed with the core in a polyethylene bag? YES NO
- f. Has the contractor elected to test the cores under Materials Procedure (Spec Reference) YES NO
- g. Were 4 loose mix samples taken on each paving day (in accordance with AASHTO T 168-97)?
YES NO
- h. Check the Quality Adjustment Factors (QAF) for the placed asphalt pavement. Is the pavement of adequate quality? YES NO

Nuclear Gauge (if applies)

- a. What is the project target density (PTD) from the test section? _____
- b. Is a qualified technician conducting the compaction testing? YES NO
- c. Is the required density being obtained prior to the mat temperature reaching 79 °C? YES NO
- d. Are random locations determined at 50m intervals? YES NO
- e. Are any two consecutive *readings* (four measurements) $<PTD \times 0.96$? YES NO
- f. Is the 10 test moving average $>PTD \times 0.98$? YES NO

PART II: PAVING OPERATION - OFFICE PORTION

This section pertains to the review of the office records for the paving operation. This section can be completed at a follow up visit once the test results are obtained (typically 7-10 days) for the paving operation reviewed in Part I or office records for a previous date of paving for this project can be reviewed.

This review is for:

_____ the paving operation reviewed in Part I

_____ a previous paving operation dated _____. (randomly selected)

Description: _____

Check the inspector's daily reports (IDR,s), pavement delivery tickets, core results and pay estimate for proper documentation of materials used, pay items involved, and required field tests and results (eg. temperatures of base and mix, yield and depth checks, application rate of prime or tack).

Dates sampled _____

IDR's _____

Pavement delivery tickets _____

Pay Estimate _____

Other Comments:

Overall Quality of Project Paving to Date (Describe quality payment adjustments, deficiencies, etc.):

PART III - CONCLUDING REMARKS

1.a. From your roadway review, do the plans and specifications appear adequate to obtain the desired product?

b. Based on discussions with the State personnel, are there any suggestions for changes in the procedures or requirements that might better improve the process?

2. Hold a closeout conference and discuss all findings and how, if any, corrective actions will be performed?

3. Summarize findings that are not procedural/project related and will need to be pursued beyond the individual project. This would include items related to standard plans, specifications, construction directives, materials procedures and the like.

